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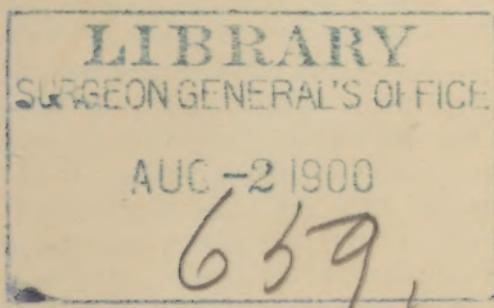
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THE deleterious effect supposedly exerted on the mucous membrane of the upper respiratory tract by the occupation of the individual is well exemplified by the granular pharyngitis and congested larynx of public speakers. Not only do these suffer from catarrhal affections of the mucous membrane, but, as we shall see later on, the various forms of acute and chronic inflammation of the pharynx can be directly traced to the occupation in many instances. As certain trades cause or predispose to catarrhal inflammations of the mucosa of the entire respiratory tract, we must study not only the pharynx, but also the nasal tissues; but it is here desired to lay special stress on the changes observed in the pharynx in the series of fifty cases forming the basis of this paper. The following case will illustrate the so-called occupation pharyngitis:

Mrs. G. K.—, aged thirty-two years, at present a laundress by occupation. She had always been in good health and had no trouble with her nose or throat, until four years ago, when, on account of reduced circumstances, she sought employment as a "bleacher" in a laundry. Within three or four months her general health began to fail and she was troubled with frequent attacks of sore throat. During the periods in which her throat was not actually inflamed there

were constant expectoration and post-nasal dropping. Examination of the pharynx showed the mucosa to be relaxed and congested, with superadded inflammation, while the nasal tissues were markedly congested and there was considerable stenosis from the turbinal swelling. The usual treatment proved of little value until she changed her occupation, when the affection no longer caused any annoyance.

Considerable variance exists among physicians as to the effect of heat, cold, and humidity upon the pharyngeal mucosa, and further scientific experimentation is needed before a definite answer to this question can be elucidated. Gradual changes of temperature, extending over the thermometric scale from freezing-point to 96° F., have practically no deleterious influence on the pharynx, provided respiration be nasal in character. The cavernous tissue of the nares adjusting itself to the altered thermometric conditions and from the increased blood supply to this region, additional heat is provided to warm the low temperature air, so that when it reaches the pharynx no chilling or irritating effects are appreciable; the contrary taking place when the temperature reaches the higher portion of the scale. Excessive heat, however, apparently produces morbid changes in the lymphoid tissues of the pharynx, but this, as shown by the dry throat of those remaining for prolonged periods in overheated rooms, depends not entirely on the degree of temperature, but to a great extent on the presence of dust, irritating particles, and the dryness of the atmosphere. Excessive cold, by chilling the surface of the body, may produce increased activity of the pharyngeal mucous membrane, even going on to acute inflammation, and if the individual be exposed for variable periods of time, chronic changes ultimately take place from repeated acute attacks of angina.

Of far more importance than continued heat or cold to the welfare of the mucous membrane is sudden

change in temperature; on a large scale this is well shown in countries where temperature extremes are prevalent, especially in the eastern portion of this country. As a general rule it may be said that where temperature changes are marked, catarrhal conditions are prevalent; this applies also to certain occupations; the worker in cold-storage warehouses, coming from a room of very low temperature out into the hot air of midsummer, is a frequent sufferer from pharyngeal affections. The degree of humidity is also a factor of vast importance, and sudden changes in the amount of atmospheric moisture are productive of a greater proportion of cases of pharyngitis than is either heat or cold. In this connection must also be taken into consideration the presence of fine dust or irritating particles in the respired air. These deleterious substances may be either chemical, as in dyeing yarns, etc., or bacterial, as in the air of the overcrowded and poorly ventilated sweat-shop.

The constant inhalation of smoke is a frequent cause of "industrial" pharyngitis, as is also the breathing of acid fumes, as exemplified in the following case:

J. R—, male, aged thirty-nine years, tinsmith by trade. He had no previous trouble with his throat until about one year ago, when he commenced to work at soldering sheets of metal. A mixture of several acids was used in this process, and the fumes arising when heat was applied were a source of constant irritation. On examination, the pharynx was seen to be moderately sclerosed, with the presence of superadded inflammation. The patient stated that his throat had been constantly sore since he assumed this occupation and was getting worse; it was also more painful at night, after he had been at work all day, than in the morning. As in the preceding case little result was obtained from the treatment until he ceased work for two weeks, when the acute inflammation disappeared and he had no trouble until he again returned to work, when the throat symptoms speedily returned.

The question at this point naturally arises as to why certain occupations cause or predispose to pharyngeal affections. The solution of the query is most complex, and to obtain a fairly accurate answer would require extended study of series of cases occurring in persons engaged in various pursuits. In the case just cited the etiological factor is readily appreciable, and so it is in many similar instances, but in the weaver and allied trades numerous factors in the etiological complex must be taken into consideration in addition to those already mentioned, the principal factors that influence the individual case being the age, both as related to the appearance of the pharyngeal trouble and the period at which the individual first entered his occupation; environment, both at home and in the factory; while the existence of nasal or general affections detrimental to the well-being of the worker must also be considered.

Of the fifty cases studied, twenty-nine were male and twenty-one female. The sexes therefore were about equally involved and apparently bore no relation to the subject. The cases were not selected, but tabulated as they were seen in consecutive order, and the following points were obtained by subjective and objective examination from each: sex, age, occupation, effect of occupation on the pharynx, presence of noticeable throat "catarrh" before assuming present occupation, and the variety of pharyngitis present. The youngest patient was thirteen years old, while the oldest was seventy; there were nineteen under twenty years of age and thirty-one who had passed this period. It was found that the age of the patient in itself bore no relation to the development of catarrhal affections of the pharyngeal mucosa, but of considerable interest was the fact strongly made evident, that the large majority of the patients stated that the daily labor at the loom or similar trade was vastly more detrimental to those under twenty years of age than to those who

assumed such occupations for the first time when older in years. In other words, all things being equal, the younger the mill worker the more rapidly would pharyngeal disorders appear; or, provided the individual already had pharyngitis, it would become worse in the youth at a much earlier period than it would in the adult.

As the cases were not selected, there were of necessity members of various trades, which at first appearance, from the limited number of cases, would apparently vitiate any conclusions that might be made; but this was found not to be the case, as the elementary etiological factors were so marked that the distinct occupations could readily be placed under separate groupings and would indicate that but a few definite factors are instrumental in the production of morbid changes of this portion of the respiratory mucosa, as we shall see later on. Of the separate occupations there were weavers or assistants 29, tinsmith 1, hat manufacturers 11, tailor 1, baker 1, dyers 3, fireman 1, carpenter 1, dressmaker 1, and laundress 1, making a total of 50 cases. As the hygienic surroundings and atmospheric conditions of a number of these occupations were practically identical, they can readily be grouped under two headings: first, occupations characterized principally by temperature elevation and the presence of an excessive amount of fibres and dust in the atmosphere, as in the weavers, a portion of the hat manufacturers, tailor, baker, fireman, carpenter, and dressmaker, or thirty-nine of the total number of cases; secondly, those in which the occupation was characterized by the presence of an excessive amount of deleterious chemical agents (acid fumes) in the respired air; this class was composed of eleven patients as follows: hatters, tinsmith, laundress, and dyers.

The relation borne by the distinctive occupation as a causative factor in the production of the morbid changes of the pharynx could be solved only by the

history of the patient, and especially by obtaining relief from the throat symptoms by leaving the trade supposedly acting as a cause. This latter, however, is practically impossible, and we must depend upon the statements of the patient in answer to this question. In every case the individual claimed that the throat trouble resulted from the occupation, and in the majority this can be assumed to be true, as this class rarely change their occupation; and further evidence of considerable weight on this point is, that when the mills are shut down for several weeks at a time, and the worker leads more or less outdoor life during this non-working period, the pharyngeal symptoms respond much more rapidly to treatment, and often when no medication is used whatsoever the attention of the individual is attracted to the improved condition of the throat. This, however, rapidly returns to its former condition within a few weeks after resumption of work.

Dependent also upon the history as related by the patient is the answer made to the question as to the presence of noticeable throat symptoms indicative of the various forms of catarrhal affections before the individual assumed the occupation directly relating to the present study, in all the cases under twenty years of age; and this arbitrary age period was selected for the reason that no previous throat symptoms had been experienced except those resulting from occasional attacks of coryza, such as is common to all individuals irrespective of occupation. The answers obtained from the patients over this age, and they were in the majority, showed that the greater part had no pharyngeal disorders previously, while a small number were troubled with previous pharyngitis, but it became markedly aggravated while at their occupation. Examination of the pharynx revealed three so-called forms of pharyngitis to be present: in thirteen there was inflammation, without other pathological changes; in fourteen the mucous membrane was sclerosed, while

in the remaining twenty-three there was atrophy of both the mucosa proper and the glandular structures.

Without burdening this paper with further details, it was ascertained from the nature of the occupation, and especially the duration of time the individual had worked at the same trade, that the pathological alterations were, with but few exceptions, directly dependent upon the nature and amount of foreign material in the respired air of the workroom. In the thirteen cases of what we may speak of paradoxically as acute inflammation of long duration the patients breathed an atmosphere more or less constantly surcharged with chemical vapors, during a considerable portion of the day. This class comprised a laundress, whose occupation consisted in bleaching soiled clothing, with a chemical compound of unknown formula; in six cases (hat manufacturers) the workers were constantly associated with various chemicals and especially mercury, used in preparing furs for felt hats; two mill hands were engaged in bleaching, three in dyeing yarns, and one tinsmith, whose case has been given above as an illustration *in extenso*.

Chronic follicular pharyngitis, granular sore throat, or, as it is more frequently called, sclerotic pharyngitis, was represented by one dressmaker, ten weavers, one fireman, and two felt-hat finishers, a total of fourteen cases; all of whose occupations were similar, inasmuch as the pharynx was subjected to constant irritation by minute particles of cloth, ashes, etc., in the respired atmosphere. The presence of atrophic changes of the pharyngeal tissues resulted from long-continued occupation in an atmosphere containing practically the same deleterious substances as that breathed in the sclerotic cases. Of these there were three hatters, seventeen weavers, one carpenter, one baker, and one tailor.

The symptoms of the various morbid changes in the pharynx were the same as those commonly observed

irrespective of occupation, and need no further mention here. All cases under the respective groups of sclerosis and atrophy were, of course, not pure cases of these pathological changes. Frequently sclerosis and atrophy were present at the same time, but, depending upon the duration of the throat affection, one was more marked than the other, and was accordingly classified from a point of the greatest pathological alteration predominating. It was also evident that sclerosis and atrophy of the pharyngeal and adjacent portions of the upper respiratory tract were simply changes in the same chain of events, the smooth, glazed surface, to which dry mucus adhered in small amounts, being the last stage of the morbid process, while subacute congestion and the various grades of sclerosis represented earlier stages of the same affection.

Two factors not as yet considered must here be mentioned, the first being the influence exerted on chronic processes by repeated attacks of acute pharyngeal inflammation, and the second being the intimate relationship existing between the nasal chambers and pharynx, both in health and disease. As is well known, repeated attacks of congestion, at frequent intervals, ultimately lead to chronic changes in the tissues so subjected. This is essentially so of the parts under discussion, and must be given a place, although secondary, when balancing the etiological factors in the class of cases with which we are here concerned. Intimately connected with this factor is the relation existing between the nasal cavities and the pharynx. It is unnecessary to enter fully into the physiology of the turbinal tissue; suffice it to say that, unless the nasal chambers are approximately normal in function, the other portions of the respiratory tract, and especially the pharynx, must invariably participate in the morbid process, and as a result, in the majority of occupations here named and the environment of the people so employed, both

nasal and pharyngeal tissues must suffer. In the worker at the loom or allied trades, turbinal swelling and nasal obstruction are of most frequent occurrence, both as a result of the irritating particles in the respired air and from temperature changes, so that mouth-breathing with all its disastrous pharyngeal and other consequences follows as a matter of course. This is well shown even in the ordinary furnace-heated dwelling-house, the extreme dryness of the air causing irritation and swelling of the erectile tissues with occlusion of the nares. Mouth breathing, as before remarked, then ensues, and, as a result of the mucus drying and closely adhering to the pharyngeal walls, normal secretion is perverted or markedly diminished, and atrophic changes supervene. At first the nasal obstruction is but temporary, but as a result of the uncomfortable sensation caused by the adhering pharyngeal mucus, mouth breathing is still further indulged in, even when the nares are free.

As the ultimate object of all such studies is the prophylaxis and treatment of these morbid conditions, a few words on this aspect will not be out of place. Treatment may be dismissed from any further consideration, as it bears no relation to the occupation as a factor, and the therapeutic means used will depend upon the choice of the laryngologist.

Prophylactic measures here, as elsewhere, are very important, and much has already been done toward elevating the hygienic standard of the mill worker, by improving his daily surroundings in the way of better ventilation, the elimination or reduction of the excessive dust in the respired air, and increasing the age limit at which the youth is permitted to enter these occupations. As regards the prevention of catarrhal affections of the upper respiratory tract, daily washing with an inexpensive alkaline antiseptic solution will be of much value; this should be done morning and evening, and during the working hours a few drops of

any of the refined petrolatum oils should be placed in each nostril. This procedure has been followed out in a number of cases among weavers, etc., and most gratifying results have been obtained.

From the small number of cases here presented, no specific conclusions as applied to occupation can be drawn, but the following suggestions are equally true in a larger sense, as indicating broader lines than the number of cases here studied warrants. We may suggest then that—

1. The pharyngeal mucosa of the mill hand under twenty years of age is more susceptible to unfavorable influences than is that of the individual over this age.
2. The inhalation of dust, fibres, and chemical agents are the factors of most importance.
3. The majority of industrial workers are affected with pharyngeal disorders, dependent to a certain extent upon their occupation.
4. In those already affected with pharyngitis before assuming these occupations, the morbid changes are augmented by the work.
5. The primary pharyngeal changes are those of acute congestion and inflammation. Chronic changes are the ultimate result.
6. The pharyngitis produced in part or whole by the occupation does not differ in any respect from the ordinary forms.
7. Provided the nasal chambers be in approximately normal condition, pharyngeal affections are much less liable to occur than otherwise.
8. Hygienic measures applied to the environment of the worker are of vast benefit as regards the improvement of his general condition and therefore of the upper respiratory tract.
9. That local care, as has been outlined, will be productive of much good.